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Using LANA for Analysis of the 400 MeV Fermilab Linac

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The LANA computer code was designed by Dmitri Gorelov and Petr Ostroumov of the Institute for Nuclear Research (INR), Moscow, Russia. This code is used for 3 dimensional beam dynamic simulations in DTL, DAW, SCS and similar linac accelerating structures. The code has been proven to be a useful tool in the commissioning of the Moscow Meson Factory (MMF) linear accelerator. The LANA code uses 3 dimensional multiparticle Monte-Carlo modeling without taking into account space charge effects. "Square" wave approximation of accelerating field and magnetic field in quadrupoles is used. RF Amplitude and Phase scanning of modules simulated and Delta-T procedure results are also determined.

LANA is similar in some respects to the Los Alamos code PARMILA. Both are Monte-Carlo codes however LANA can be easily extended to various linac structures while PARMILA is designed solely for the use of drift-tube linacs and beam transport lines. Another commonly used beam dynamics code TRACE-3D, calculates only the envelopes of a bunched beam. It also is somewhat restricted in its focus, namely coupled cavity linacs. LANA appears to bridge the gap between these two codes.

The original implementation of this Fortran code was on DOS computers and has recently been modified to run on Sun UNIX workstations. This allows an increase in speed and easier accessibility during commissioning of the Fermilab Linac Upgrade.